

REMARKS/ARGUMENTS

Applicants respectfully request a reconsideration of the rejection of the claims. Applicants have carefully reviewed the Office Action dated March 21, 2003 and the cited art and have amended the claims in an effort to gain allowance of the case. A total of 27 claims remain in the case. Claim 19 has been canceled without prejudice. The subject matter of claim 19 has essentially been incorporated into amended 1 and 28. Dependent claims 2-18, and 20-27 remain as originally filed.

The Invention

5 The invention relates to a polymer alloy composition that comprises a brittle polymer, a plasticizer, and a ductile polymer or a rubbery polymer or both a ductile polymer and a rubbery polymer. As first taught on page 5, lines 20-24, and throughout the
10 specification of the patent application, the plasticizer, preferably, mineral oil, is part of the brittle polymer and is mixed into the brittle polymer prior to the brittle polymer being blended/mixed with the other polymer components of the polymer alloy of the
15 invention.

 The Applicants have found that blending/mixing the plasticizer into the brittle polymer in the manner discussed in the preceding paragraph and increasing the molecular weight of the brittle polymer result in a
20 tough, transparent high impact polymer alloy with an acceptable Notched IZOD value and with very little haze.

The advantages of adding the plasticizer to the brittle polymer are outlined on page 10 of the specification. One advantage is that since the efficiency of the rubbery and/or ductile components is increased, then
5 very little or no rubbery polymer or ductile polymer may be needed in the polymer alloy of the invention in order to produce the desired properties of the transparent high impact polymer alloy of the invention, which properties are improved toughness with excellent
10 transparency and/or improved low haze with improved toughness and stiffness.

Claims 1 and 28 have been amended to more clearly recite the plasticizer as being blended or added to the brittle polymer prior to the brittle polymer being added
15 to the other polymers of the polymer alloy of the invention and the plasticizer as residing in the brittle polymer (Claim 28). The molecular weight of the brittle polymer, which is greater than 180,000 and preferably ranges between 220,000 and 300,000 and which may be as
20 high as 400,000 is also recited in a number of the claims.

Claims 1-28 Rejection Under 35 U.S.C. 103 (a)

Claims 1-28 are rejected under 35 U.S.C. 103 (a) as
25 being unpatentable over Blasius in view of Hanes.

The Examiner states that Blasius discloses polymer alloys comprising brittle, rubbery and ductile polymer each with a monomer make up satisfying the limitation of the instant claims (see claims). However, Blasius fails
30 to explicitly recite the incorporation of plasticizer. The reference to Hanes teaches a composition comprising three distinct polymers of monomeric make up similar to

applicants' polymer (see claim). This reference further teaches the incorporation of common adjuvants including plasticizer at column 8, line 30. Therefore, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art to incorporate a plasticizer with the composition of the primary reference (Blasius) in order to achieve their known benefits. Furthermore, applicants' limitation to molecular weight of the brittle polymer is seen or inherently met by the NAS 30 polymer taught by the primary reference.

Blasius discloses and claims a polymer alloy that consists of three polymers, i.e. (a) 70 to 30 weight % of a brittle polymer; (b) 5 to 30 weight % of a rubbery polymer; and (c) 65 to 25 weight % of a ductile polymer. The Applicants admit that these three polymers are similar to that of the polymer alloy of the invention; however, a significant difference of the invention, as stated hereinabove and as taught in the specification of the patent application, is that in the invention the plasticizer is first added to the brittle polymer before the brittle polymer is combined with any of the other polymers. The addition of the plasticizer to the brittle polymer and the increased molecular weight of the brittle polymer advantageously results in that the rubbery and/or the ductile polymers may not be necessary in the polymer alloy of the invention, and thus, the reason for claiming, particularly in claim 1 of the subject patent application, the lower range of the weight percentage for both the rubbery polymer and the ductile polymer as being "zero".

In summary, the difference between Blasius and the claimed invention is that in the invention a plasticizer is added to the brittle polymer and substantially resides in the brittle polymer, and the other two
5 polymers may or may not be added to the brittle polymer, to produce a transparent high impact polymer alloy with improved toughness with excellent transparency and/or improved low haze with improved toughness and stiffness.

Hanes discloses in column 1, lines 65-67 to column
10 2, lines 1 to 13, that improved clarity can be achieved in blends of two immiscible transparent polymers which have dissimilar refractive indices by addition of a third polymer which is selectively miscible with one of the two immiscible transparent polymers. The third
15 polymer has a refractive index such that the refractive index of the third polymer and the refractive index of the polymer with which it is miscible will bracket the refractive index of the polymer, which is immiscible with each of the other polymers. For example, if
20 immiscible polymers A and B have refractive indices of 1.57 and 1.58, respectively, then a third polymer C which is miscible with Polymer A must have a refractive index greater than 1.58 to be useful in practicing the invention in this example. A third polymer C which is
25 miscible with Polymer B must have a refractive index of less than 1.57 to be useful in practicing the invention in this example. Here also, at least three polymers are needed and claimed in Hanes. The refractive indices of the three polymers are manipulated in order to achieve
30 less haze for clarity purposes.

In column 8, lines 28-38 disclose that "The blends of this S-B/SMA blend system may contain certain other

additives to plasticize, improve impact or flexural strength, improve processability, extend, lubricate, prevent oxidation, flame retard, dye, tint, etc., the polymeric composition. Such additives are well known in the art and may be incorporated without departing from the scope of the invention. The amount of additives may vary according to the additive, and/or its form, and/or its concentration."

Applicants admit that the use of a plasticizer is known, and that additives to plasticize, etc. is known. However, Applicants do not agree that it is known in the art to add a plasticizer, preferably, mineral oil to a brittle polymer to obtain the desired properties of a transparent high impact polymer alloy composition such as that disclosed and claimed in the subject application.

In Hanes, an additive to plasticize is optional. In the invention, the plasticizer is critical in obtaining the desired properties of the polymer alloy.

In Blasius, the index of refraction of the brittle polymer is matched to the index of refraction of a blend of the ductile and the rubbery polymers within + or - 0.01. In the invention, the migration of the plasticizer from the brittle polymer to the other polymers is taken into account in order to get the refractive indices of the phases each composed of several components to match. (Page 17, lines 5-10.) Claims 20-24 of the subject application recite the matching ranges for the indices of refraction of the different phases of the polymer alloy and the percentage of haze for these matching ranges.

Nowhere in the cited art whether taken singly or in combination is there taught, disclosed, or even suggested the addition of a plasticizer to a brittle polymer prior to the brittle polymer being added or mixed in with any of the other polymers of the polymer alloy.

Applicants submit that the claims including claims 1 and 28 are patentably distinct from the cited references. Claims 2-18 and claims 20-27 are patentable on their own merits in addition to their dependency on patentable claim 1.

Summary and Conclusion

It is respectfully submitted that for the first time Applicants provide a unique polymer alloy composition for obtaining desirable properties for a transparent high impact polymer alloy with a low haze and improved strength whereby a plasticizer is added to the brittle polymer prior to the brittle polymer being added to any other polymer components. Amended independent claim 1 and claim 28 which is dependent on claim 1 further characterize and patentably distinguish the invention over the cited references.

This is a no-free amendment, other than the fee due for the three-month extension of time. However, if there is a fee due, Applicants authorize their Account No. 501679 to be debited in the appropriate amount.

In view of the above comments and amendments, it is respectfully submitted that the application is in proper form for an issuance of a Notice of Allowance. Such action is respectfully requested at an early date.

Respectfully submitted,


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